

EXCAVATIONS AT SITE N38/30, MOTUTAPU ISLAND, NEW ZEALAND

ANNE LEAHY
AUCKLAND

Abstract. Site N38/30 was excavated in the 1967-8 season as a second sampling of the undefended sites on Motutapu. Results paralleled and augmented those from site N38/37. The excavation also revealed evidence of the association of a surface house and rectangular storage pit. A number of artifacts, especially adzes, are described.

N38/30 was chosen as a small test site to investigate another ridge similar to that of the main excavation at N38/37 (Davidson, this volume). Two four-metre squares were put down in checker-board fashion on a small terrace half way up the steep slope that dropped from the higher level of the ridge to the swamp below (Fig. 1). A lower terrace, about 20 feet (6.1 m) above the swamp, was rejected because a deep narrow trench parallel with the edge of the terrace appeared to be an Army slit trench.



FIG. 1. View of site N38/30 from the beach at Station Bay.

Site N38/30 was the second terrace above the swamp. It had been made by cutting back and levelling the slope so that a crescent-shaped flat area of about 12 square metres was formed. The presence of pits on the terrace was suspected from surface indications. The scarp rose steeply as a bank on the uphill side and dropped away as a steep slope on the other three sides.

Square 1, the first 4 m square, was on the west side of the central base line and included the lower portion of the back scarp. Square 2 was forward and to the east of square 1 and the base line. Its southern boundary included the tip of, but did not go down over, the lower slope (Fig. 2). The two squares were excavated simultaneously but square 2 was divided into two sections. The first part was begun as a 2 m x 4 m area in case time did not permit total excavation. This square was later excavated fully, except for a 2 m x 50 cm central baulk on the south side, which was left intact.

DESCRIPTION OF LAYERS AND THEIR FEATURES

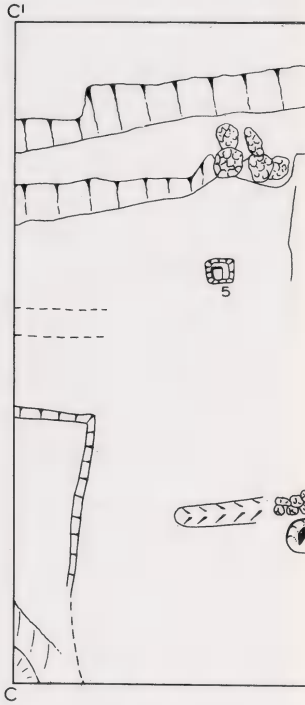
(Figs. 2 and 3)






The natural stratigraphy was the same as that at site N38/37 (Davidson, this volume).

LAYER 1. SQUARE 1

This consisted of the clay natural which had been modified by the construction of a floor structure, probably a house structure, lying in a north-south direction, 1.8 m x 2.8 m (Figs. 2 and 4). The external shallow drain showed clearly down the east baulk line and, along the top, by the base of the bank at right angles to the base line. It eased into a shallower line for a short way and then became a more definite, but still shallow, depression turning externally round a posthole at the 2 m line. The drain continued about one-third down the west side, gradually merging to ground level. Inside the north-east corner was a right-angled, drainlike depression, narrower (5 cm) and deeper than the outer drain. It extended for 65 cm down the east line and 40 cm along the north side. It was in this area that adzes AR 731, AR 739 and AR 738 were found. They were under a lumpy clay pan and resting on the clay floor between the two drains.

Within the outer drain of the structure were four postholes, all of which were stepped. Posthole 1 was a semi-circular hole 43 cm deep and 32 cm across. It had a step 28 cm deep on the outer side and, external to that, a small stake hole 31 cm deep. This posthole was in line with posthole 2, situated approximately in the middle of the structure. It was smaller (40 cm deep and 8 cm wide with a step 32 cm deep and 12 cm wide) than posthole 1. Posthole 3, in the south-west corner, was 50 cm across with a step about 47 cm deep. On the inner and west side of this posthole was a small drain, cut sharply in the floor, that sloped into the posthole. Outside this, the clay from the drain was piled up to form a small bank, thus making a shallow drain between the cutting and the bank. Posthole 4 was in line with posthole 3 in the north-west corner of the drain outline. The deep part of the hole was towards the base line side of the structure and was 65 cm deep. It was a slab-shaped fissure with a shallow step, about 15 cm deep, opening into it. Exterior to



-  bank
-  stepped pos
-  clay lumps
-  depression
-  low banks

N 38/30 STATI
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metre

FIG.

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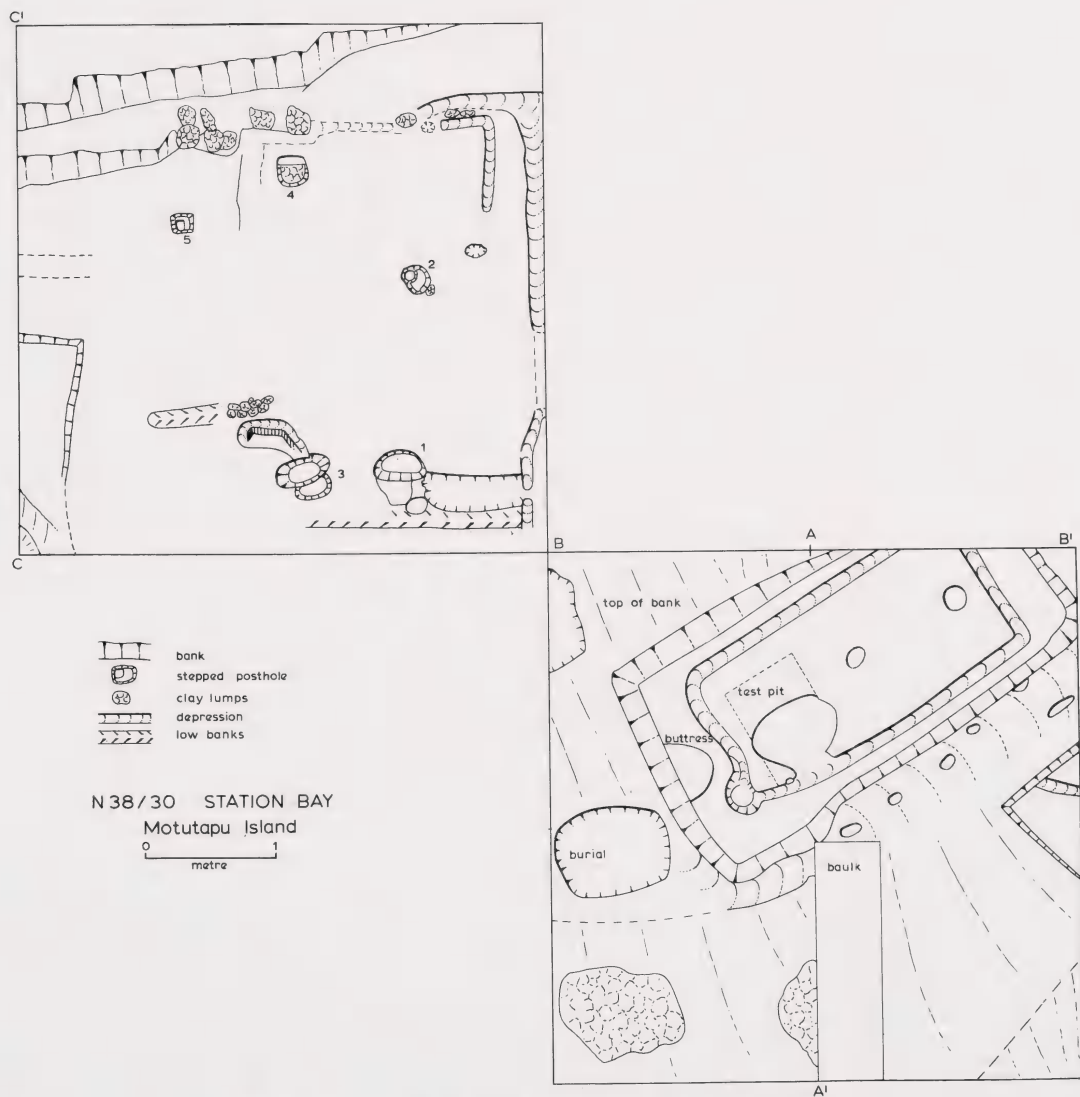
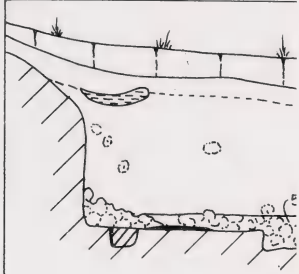
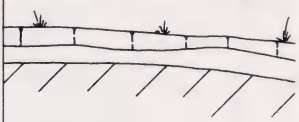


FIG. 2. Plan of features, N38/30. True north is 21° east of baseline C—C¹.

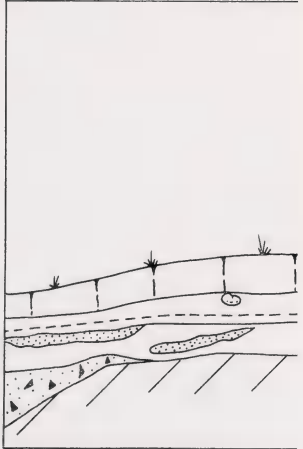
A Sq. 2



B Sq. 2



C Sq.



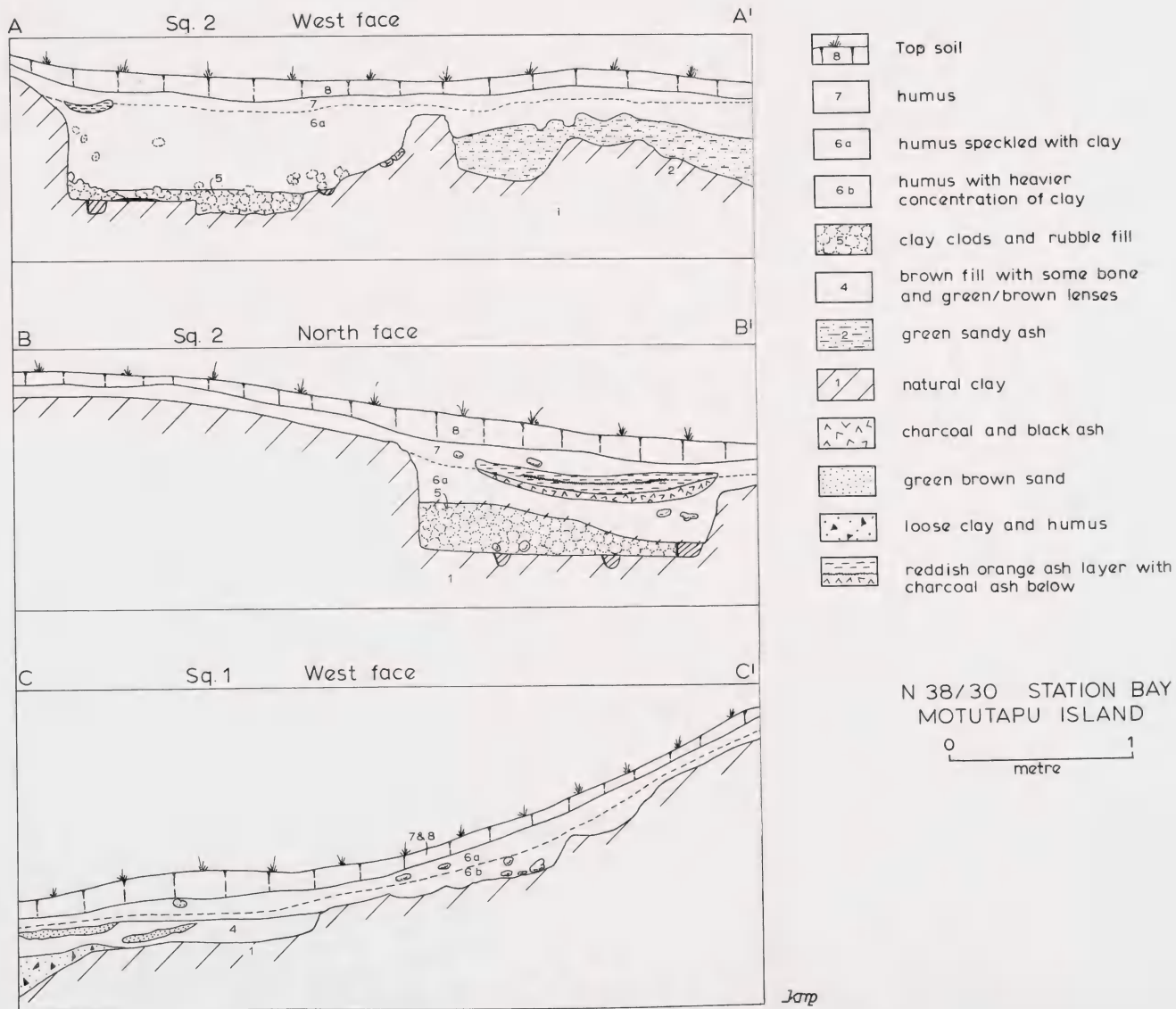


FIG. 3. Principal cross-sections, N38/30.

the structure, and about 25 cm down from posthole 4, was posthole 5 (the west drainlike depression becomes indistinguishable at about this position), which was a square, stepped hole, 16 cm wide. In the lower left corner it dropped to 51 cm, and was 8 cm across.

In the south-west part of the square the corner of a shallow rectangular pit showed. It was 48 cm wide, 100 cm long, and 10 cm deep. The floor dipped away perceptibly and disappeared into the south-west corner of the bank. This dip seemed to form the outline of the natural bank. The pit or terrace was filled with a mixture of greenish-brown sandy earth containing a little bone material of a very fragile nature and a few broken shells (*Amphidesma australe*). This layer was sealed in by layer 6.

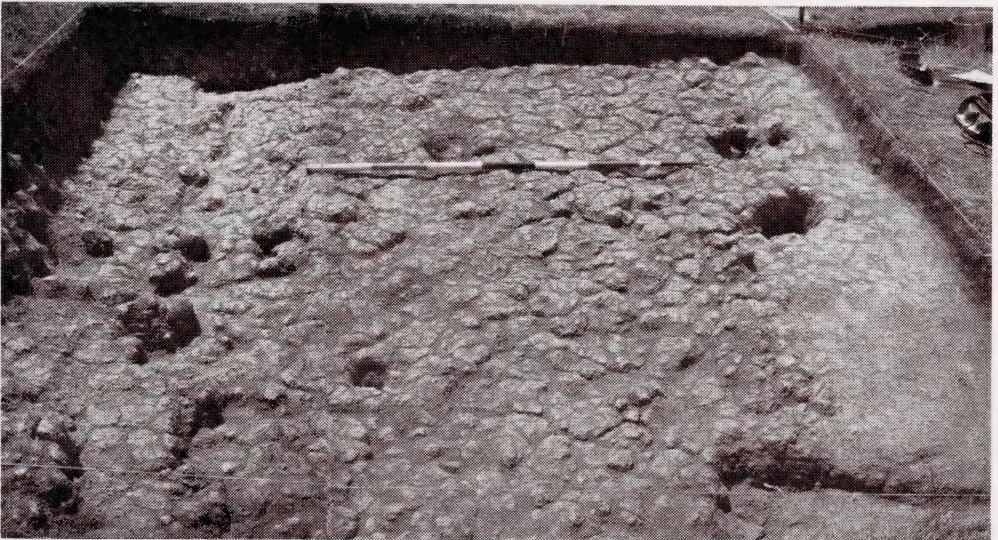


FIG. 4. House floor cut into layer 1, square 1, from the south-west, N38/30.

Along the south end of the square there was a more compressed and paler strip of clay surface material (Fig. 4). This was bounded on the north side by a low mound that terminated the house structure. This strip extended from the central ridge path to the pit/terrace structure in the south-west corner of the square.

Several alterations to the house structure appear to have occurred whereby the posts in the postholes were shored up or renewed and a new drain was cut in the north-east corner. The use of posthole 5 and its relation to the house structure, if any, are unknown. Finally, all the postholes had been plugged with lumps of clay, probably at the beginning of the layer 6 occupation.

LAYER 1. SQUARE 2

Into the clay natural in this square were cut three main features, a large storage pit, the corner of a rectangular structure similar to that in square 1, and a shallow depression. The large pit was 3.4 m x 1.7 m and was 80 cm deep at the north bank edge (Fig. 5). The floor consisted of a flat smooth area with a narrow regular drain,

8 cm wide, cut 10 cm in from the north and south sides and about 30 cm in from either end. At the west end of the pit was a low buttress. The drain curved inwards around the buttress and then out again to a deep angled sumphole in the south-west corner. The drain, where it entered the sump on the south side, had been disturbed, as had an area 60 cm x 70 cm in the pit floor near the buttress. The smooth clay floor had been dug unevenly to a depth of 8 to 10 cm. There was no sign of a posthole having penetrated anywhere below this disturbance and, as the other two postholes in the pit were 20 to 22 cm in depth, had there been a similar one near the buttress it should have shown below the disturbance. Both the drain and the sumphole were filled with a fine yellow-black water-deposited silt and fine charcoal. Over most of the smooth pit floor was a wash of ash and charcoal and a few larger pieces of charcoal as if small branches and bracken had either been burnt in the pit or had fallen into it. Layer 5 had been placed over this deposit.

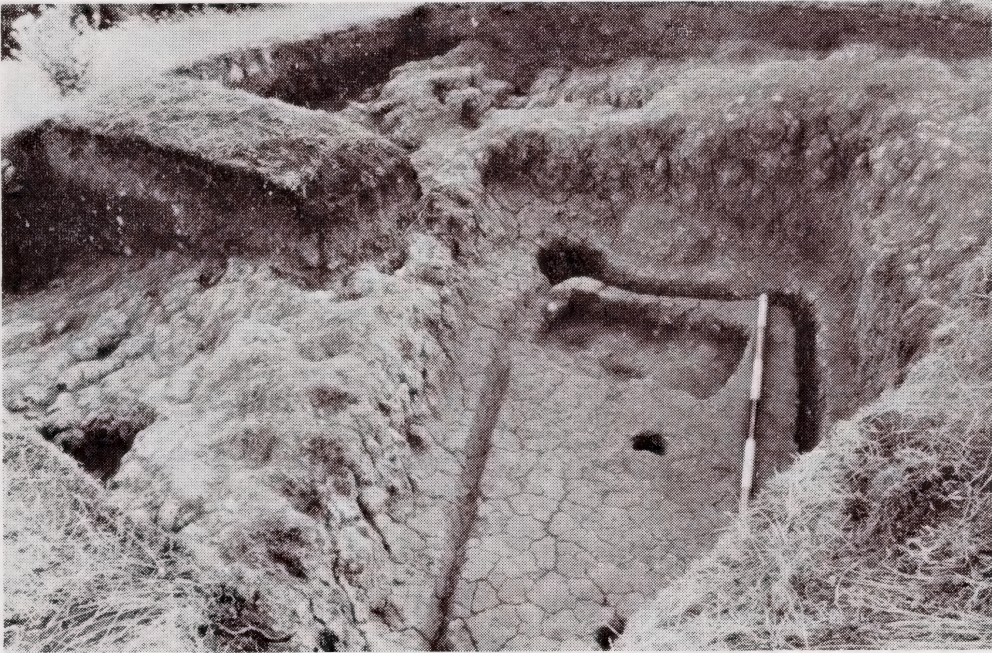


FIG. 5. Square 2, showing storage pit, from the north, N38/30.

Two rounded postholes were found in the pit, one at the east central end, 22 cm deep and 16 cm across, and the other in the centre of the pit, 20 cm deep and 15 cm across. Both these holes were hollow, requiring no excavating, and were covered over by the lumpy clay fill of layer 5. Something had prevented them from being filled with rain-washed silt or dirt, and no evidence of wooden posts was found. The holes were empty except for rounded stalactite-like dust accretions that fell away from the sides when the holes were investigated.

Along the top of the south bank of the pit there were five small depressions in the weathered clay, which could have been the resting slots for beams of a roof. Below the outer edge of the bank, before the area cut away to form the corner of a

small pit or terrace, was a narrow slot, 24 cm long, possibly made by a flat board placed in the ground.

The rectangular corner of the pit or terrace contained a shallow silt-filled drain that flowed from the north-west corner into the east baulk. The silt in the drain, although containing a mixture of earth and clay, showed no charcoal or ash. The drain emerged from the north bank of the pit/terrace, but did not appear to drain the large pit above or penetrate the bank for more than 10 cm, and no trace of a drain outlet was found in the corresponding area in the large pit. The clay floor of the small pit/terrace was even, but not as smooth as that of the large pit, and sloped slightly until it entered the baulk. Apart from the drain, it was similar to the pit/terrace in square 1, layer 1. Neither of these structures was fully excavated and both remain in the baulks.

The lower third of the square consisted of a very irregular and humpy surface of weathered and crumbling clay. In the south-west corner were patches of what appeared to be charcoal. Upon investigation these were found to be the remains of tree roots. All this south-west corner was covered with the sterile undisturbed greenish-brown layer 2, believed to be Rangitoto ash. In the crumbling clay in the south-west corner a piece of kauri gum was found.

On the bank to the west of the large pit there was a shallow depression, 84 cm from west to east, 64 cm wide, and 20 cm deep, cut into the clay natural. It was in this basin that a crouch burial was found. Behind and above this the clay was pressed hard as if it had been used as a pathway. (It is still the natural pathway up the ridge.) Pressed into the surface was a white ash-like material with several lumps of orange-brown crumbly burnt clay. This coating could have been wood ash from the extensive lenses of layer 7 that seal off layer 6 in the pit.

LAYER 2

This was a greenish-brown sterile sand, identified as Rangitoto ash. There was no trace of this layer in square 1 except for a few lenses in the fill of the small pit in the south-west corner. In square 2, the ash covered the lower third of the square, with the highest concentration in the south-west quadrant. In this quadrant the ash was 30 cm thick in the deepest part. Where it was undisturbed the ash rested on the weathered clay natural but, in some places in the south baulk, there were faint indications of a buried soil. The ash was shallower in the south-east quadrant of square 2, where it had been dug into in several places. It forms the basis of the soil content of layers 3 and 4. A *haangi* pit had been dug into the ash near the south baulk. At the bottom, but near the south side of the *haangi* pit, there was an irregular crumbling hole partially filled with a mesh of tiny roots supporting dusty clay. This appeared to be a natural hole, possibly left by a disintegrating tree stump. There was no ash or charcoal in the hole.

LAYER 3

This was a layer of greenish-brown sandy material mixed with numerous clay flecks, a little midden, ash, and charcoal. It filled the small pit/terrace, except the drain, in square 2 and slightly overlapped its upper edge. Layer 3 also overlapped the lower portion where it merged with a thick charcoal lens that continued to the edge

of the *haangi* pit where a heap of *haangi* stones was found. The layer then appeared as a thin stratum above sterile layer 2 and covered the irregular hole in layer 2. It continued as a thin layer into the central half-baulk, but did not re-appear on the other side.

LAYER 4

A greenish-brown sandy material, similar to layer 3, composed layer 4, but it was mixed with an increasing amount of midden, obsidian, flakes, and stones. The fill of the small pit in square 2 was covered by layer 4 and it extended up to the highest point of the bank on the south side of the large pit. It covered all the lower portion of the south-east quadrant until it disappeared into the central half-baulk, but did not appear in the fill of the big pit or in the north half of the square except in the fill surrounding the burial which was then sealed off by a clay layer. The fill covering the burial contained a few small stones, fragments of broken stone, and one half of a pipi shell, *Amphidesma australe*, which was in the earth found inside the skull. The fill was similar in composition to layer 4 and surrounded the whole skeleton under the clay layer that had been placed over it. The fill of the small pit in square 1 also contained material similar to layer 4 although it had slightly more clay flecks mixed with it. This fill had no shell, but there were a few fragments of crumbling fish bone with one or two fragments that may have been bird bone.

LAYER 5

This consisted of a covering of clay lumps and earth over the smooth floor of the large pit in square 2. It was thinner at the east and south, but became thicker towards the west wall. Beneath this deposit at the west end, resting on the original floor, was a lump of charcoal and a wash of greasy charcoal and clay with occasional burnt bracken stalks. The clay lumps had not been packed down to make an even floor and the cracks were filled with layer 6 material. This clay at first suggested a cave-in of the north bank of the pit which was very cracked and weathered, but further investigation showed that a drain had been roughly formed out of lumps of clay pressed back from the south wall of the original pit. This drain continued round to the east wall where it became more definite and wider (14 cm) and entered the north baulk. The east end of the drain was filled with dirt and silt, but further round, on the south wall, it contained small lumps of clay as well as sediment. This clay loosely filled and covered the disturbed area in the clay natural of the original floor. It surrounded but did not cover the buttress. The sump hole was also covered. The bank of the pit did not appear to have been cut back to provide this covering, but in the north-west corner a portion had crumbled down on to the floor at a later date. It would seem more likely that the clay for this floor came from another part of the site, possibly from the unexcavated square on the terrace, behind and level with square 1. Surface features suggested some sort of pit in this area. Alternatively, it may have come from the alterations in square 1, but this is doubtful as the clay surface there, though irregular, does not seem to have been dug into very much.

LAYER 6 (LAYER 6A AND 6B)

Where layer 6 rested directly on the clay, the prevalence of clay particles in the black earth was more pronounced. As the layer developed, fewer and fewer clay particles appeared. Because of the problem of soil movement or creep, all the artifacts

found between the clay, or layer 2, and the first 10 cm of layer 6 were treated as layer 6B and all those above, as layer 6A.

Layer 6 covered the whole site except at the point where the two squares met. Here was situated the path between the house floor and the pit. This path ran up the central part of the ridge where the clay natural was covered by a thin layer of humus and ash material, probably layer 7, and then the turf. This was only a small area, situated on the crest as the path dropped down a slight bank.

Where layer 6 rested on layer 2, Rangitoto ash, there was a slight mixing of the two soils, but the latter was of a much sandier nature and clearly distinguishable. Layer 6 there still had clay particles mixed with it, but fewer than where it rested directly on the clay.

It was in layer 6 that most of the artifacts were found. This layer formed most of the fill of the large pit and merged amongst the clay lumps on the false floor (layer 5). Layer 6 covered all of square 1 and also square 2 except at the south-east edge where the bank had been built up with a few lumps of clay. It lapped against this bank, but did not cover it and only thinly covered layer 4 in this area.


LAYER 7

This was a black humus layer with no clay particles. It covered a large portion of the site, but became indistinguishable from the turf layer in many places. It was deeper at the base of the bank in square 1 where it had accumulated as a result of activity and erosion higher up the ridge. This layer was also deeper where it filled the pit depression. In this depression, and into layer 6, had been dug the two *haangi* pits filled with ash. Piled up by the side of the east *haangi* was a collection of ten smooth unbroken greywacke stones. Stones, broken and unbroken, were a feature of layer 7, the largest proportion being found at the base of the bank in square 1 where they probably rested after rolling down from higher up the ridge. Other stones could have been associated with the layer 7 *haangi*. Only one flake was found in this layer.

Layers 7 and 8 have been combined in Fig. 3 because it was difficult to differentiate between them and they were probably part of the same build-up process.

THE BURIAL

Soon after the removal of the top soil, layer 7, and a portion of layer 6, the skull of a skeleton was uncovered (Fig. 6). This was crushed at an earlier period, apparently by natural causes (the head was situated close to the ridge path), but further crushing occurred during excavation. The shattered skull case was filled with a greenish-brown material that contained half a pipi shell. The skull was lying on its right side and was contained within a U-shaped basin formed by clay lumps moulded into a hollow and a certain amount of excavation of the clay natural. The upper portion of the skull was facing out towards the open end of the hollow. The clay moulding went over the neck of the skeleton and slightly over the top of the shoulders as if to protect or outline the head because of the shallowness of the grave.



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FIG. 6. Burial, square 2, N38/30.

The teeth were worn almost down to the jaw and were very yellow and discoloured. The skeleton appeared to be that of a mature woman.

Further excavation revealed a hard clay pan, 5 to 10 cm thick, that had been plastered over the rest of the skeleton. It was difficult to remove without damaging the bones beneath, but finally the whole burial was exposed. The body was lying on the right side in a crouch position with the left arm folded across the top of the chest and the left hand placed under the head as if the face had been cupped in the hands. The legs were bent up, but were outside the arms. The skeleton was in an articulated position except for the toe bones. Two of the toe bones were found about 15 cm east of the end of the burial in layer 6, and one large toe bone was found in the layer 6 fill of the large pit under the fire pit in the west end. This probably came from the skeleton as no other human bone was found on the site. The rest of the toe bones were not found.

The skull, rest of the skeleton, and the clay pan were surrounded with a greenish-brown sandy material, Rangitoto ash, with some earth, small stones, broken stone, and natural flakes in it. There was a piece of kauri gum in the fill at the south end of the depression near the jaw. The greenish-brown sandy material was very similar in appearance to layer 4, but without any midden except the pipi shell. This places the burial in association and contemporary with layer 4. If the burial had occurred during the accumulation of layer 6, it should have been surrounded by a layer 6 type of fill, but this did not occur under the clay pan. The disturbance in the clay floor of the large pit may have been caused by the removal of clay with which the body was covered and the head outlined.

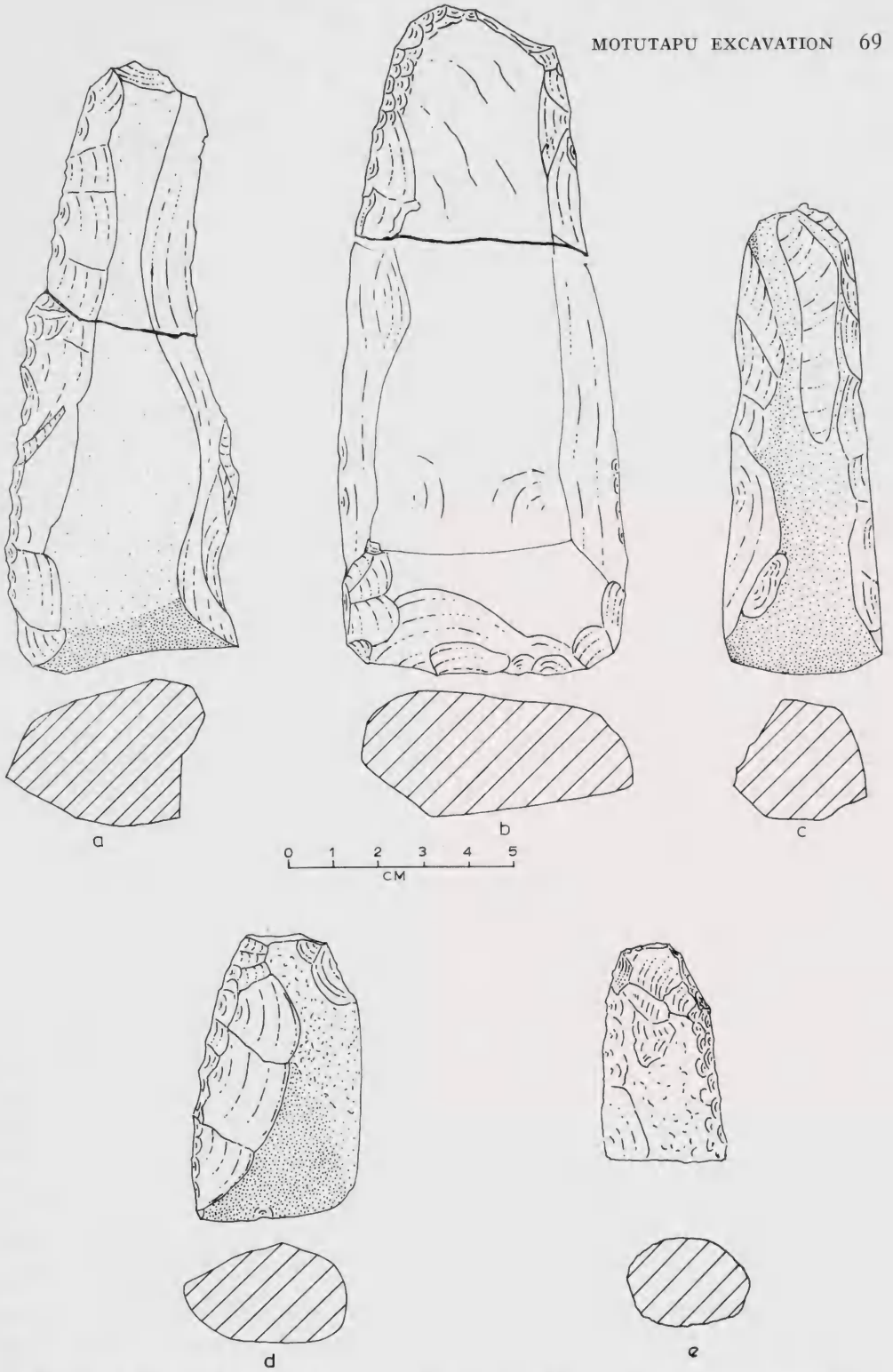


FIG. 7. Adzes from layer 6, N38/30: a. AR 779 and AR 862, from square 2, layer 6B. b. AR 842 and AR 771, from square 2, layer 6A. c. AR 752 from square 1, layer 6A. d. AR 724 from square 1, layer 6A. e. AR 732 from square 1, layer 6B.

ARTIFACTS

ADZES

Most of the adzes did not fit into any current classification. They fell into two main categories:

- (a) small, 9.6 cm and under, with lenticular or plano-convex cross-sections and tapered towards the butt, and
- (b) medium sized, between 9.7 and 14.9 cm.

Two of the latter were complete, but broken in half. AR 752 (Fig. 7c) was nearest in size to the smaller group, but differed from them in its subtriangular section. Only two adzes appeared to be complete, AR 752 (Fig. 7c) and AR 724 (Fig. 7d). AR 752 was a dark fine-grained stone, probably greywacke, but finer than that usually found on Motutapu. It was sub-triangular apex down in cross-section, and was shaped entirely by flaking. All the edges left by the flaking had been ground and the blade sharpened front and back. AR 724 was a short (6.2 cm) partly polished adze with a deeply flaked butt. Several flakes had been struck from the left back side after polishing and the side edge rechipped as if to modify it. A third adze, AR 738 (Fig. 8b), although without a polished blade, had a partially smoothed front blade end surrounded by hammer dressing suggesting use wear rather than grinding.

Square 1, layer 1. Four lenticular adzes were found resting on layer 1. Three roughouts in a cache, AR 737, 738, and 739 (a blade end), were on the clay between the later internal and the earlier external drain of the house site. These adzes were covered with clay lumps that could have come from the excavation of the later inner drain. Their similarity in size and appearance suggests that they were made by the same person (Fig. 8). A roughout, AR 740, was found in a depression in the clay near posthole 3 and is also associated with layer 1.

Square 1, layer 6B. AR 744 was a large flake from the upper side, showing secondary flaking and some hammer dressing. AR 732 was the butt end of a chisel type with an ovoid/round cross section. It was hammer dressed all round (Fig. 7e). AR 741 was a small piece of the butt end of a roughout, partially hammer dressed on the upper surface.

Square 1, layer 6A. AR 752 was the sub-triangular adze already mentioned (Fig. 8c). AR 724 was described above (Fig. 8d). AR 764 was a butt end of a roughout, but hammer dressed on the front, flaked and partially hammer dressed on the back. It is very similar to the adzes found in layer 1. AR 760 was a small butt end of a narrow adze, or possibly a chisel, flaked on the back and hammer dressed on the front side. AR 753 was the butt end of a larger roughout, somewhat sub-triangular in cross-section. It was bruised rather than hammer dressed along one side.

Square 2, layer 6B. AR 779/862 (Fig. 7a) were two halves of a crudely flaked, medium-sized roughout. The blade end, AR 779, was found resting almost on the undisturbed layer 2, below and to the right of the burial. The butt, more triangular in cross-section than the blade, was found about half way down in the fill of the pit

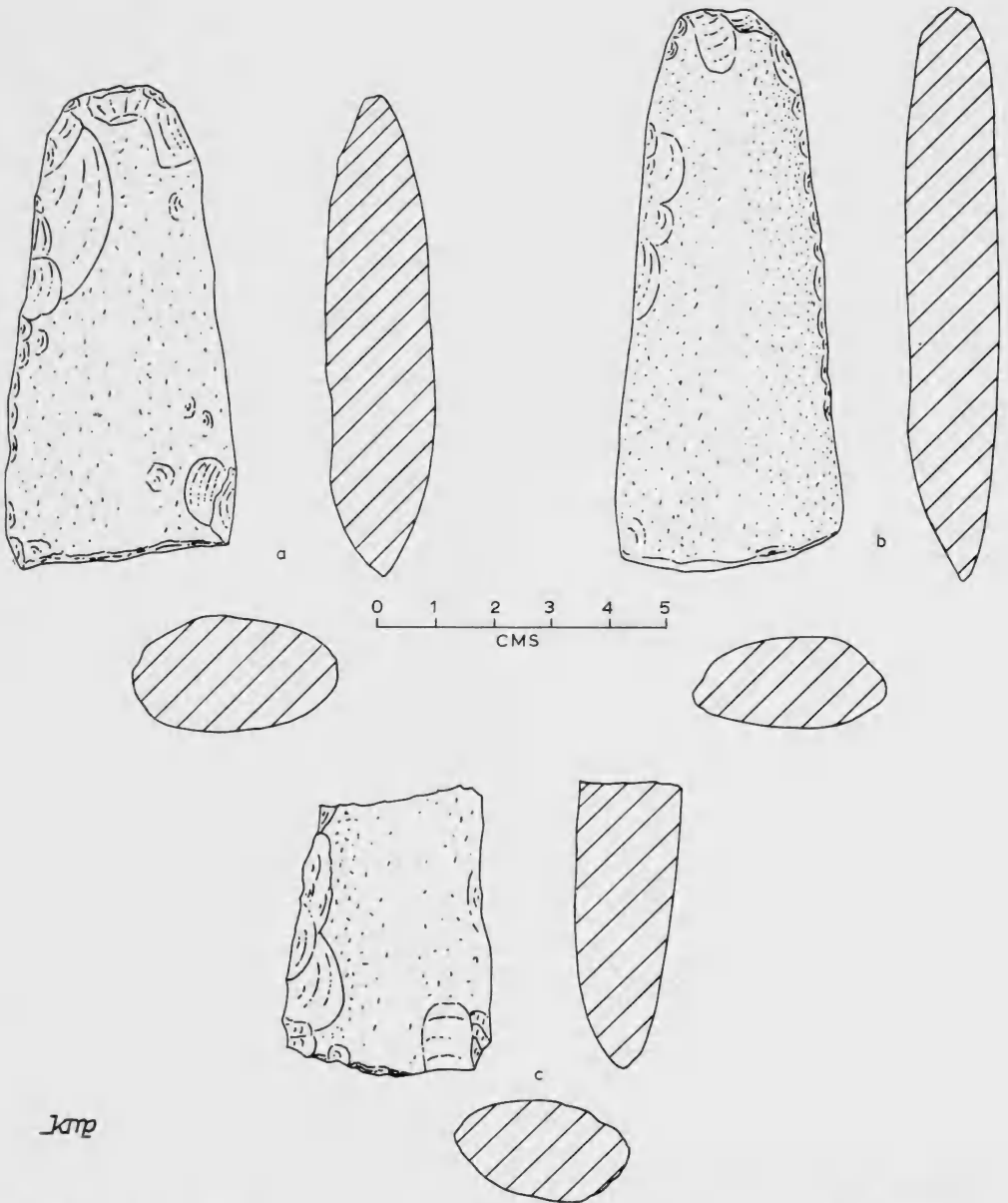


FIG. 8. Cache of three incomplete adzes found resting on layer 1 in square 1, N38/30:
a. AR 737. b. AR 738. c. AR 739.

in layer 6A. This suggests some back fill into the pit as a toe bone, presumed to be from the skeleton, was found in the same area. AR 805, formed from a large flake, was pointed and flattened front and back, and bruised along one edge. It appeared to be the butt of a roughout.

Square 2, layer 6A. AR 771/842 (Fig. 7b) were two halves of a medium-sized roughout, quadrangular in cross-section and slightly curved on the front surface.

The back had two large flakes struck longitudinally, and a very small part of the ridge between the two flakes showed hammer dressing. The rest of the roughout was flaked. The front surface still had some cortex showing. Both parts were found in the pit fill about 20 cm apart. AR 801 was a small complete roughout, hammer dressed on the front surface and flaked on the back. The blade was shaped by flaking back from the front edge. The "cutting edge" surface was a flat plane about 5 mm thick but, with a little more work, could have been sharpened for use. This adze was very similar to those found in layer 1. AR 830 was the butt end of a lenticular roughout, hammer dressed front and back, with a large flake out of the back surface. It was similar to those in layer 1. AR 847 was a small butt end of a lenticular roughout, hammer dressed on the front surface. Some cortex showed. It

TABLE 1A
ANALYSIS OF ADZES IN SQUARE 1, N38/30

Sq.1 no.	LAYER	LENGTH CM	WIDTH CM	THICK CM	CROSS SECT.	WEIGHT OZ.	STONE	HAMM DRESS.	FLAKED	POL. BLADE	COR-TEX	COM- PLETE	INCOM- PLETE	ROUGH- OUT
737	1	8	4	2		3	g.w.	x	x			x		
738	1	9.6	3.6	1.5		3½	g.w.	x		parti-ally?	x	x		
739	1	4.9	3.6	1.8		2	g.w.	x	x					blade end
740	1	7.2	3.2	1.4		1½	g.w.	x	x					butt end
741	6 b	4.8	3.8	2.6		2	g.w.	x	x					butt end
732	6 b	4.5	2.1	2		1½	g.w.	x	x					butt end
744	6 b	8.7	3.6	1.4		2	g.w.	x	x			x		x
752	6 a	10.3	3.5	2.3		4	g.w.		x	x		x		
724	6 a	6.2	3.7	1.9		2½	g.w.	x	x	x		x		
764	6 a	5.2	3.7	2.1		2	g.w.	x	x					butt end
753	6 a	6.6	4	2.8		4	g.w.	x	x		x			butt end
760	6 a	4.1	3.1	2		1	g.w.	x	x		x			butt end









was flaked on the back surface, and appeared similar to the layer 1 group. AR 861 was the butt end of an oval stone showing considerable cortex. It had several large flakes struck from it.

All the adzes on the site were made of greywacke, probably of local origin, except for AR 752. This could have been made from a sea-rolled beach stone, or have been brought from another locality where a fine-grained greywacke occurred.

Twelve of the twenty adzes, part adzes, and roughouts were lenticular or plano-convex in cross-section (Tables 1a and 1b). One adze was sub-triangular in cross-section; one roughout was sub-triangular in mid cross-section though more quadrangular at the blade end; one small flake roughout appeared to be sub-triangular in its unfinished state; one roughout was quadrangular; the final four were indeterminate.

The medium adzes were shaped by flaking, but the small adzes had also been heavily hammer dressed with the minimum of flaking. This was probably because of the technical difficulties of flaking a small object. The twelve hammer dressed adzes or roughouts were surprisingly homogeneous in appearance and suggested either one craftsman or a tradition of adze-making for a specific purpose. The majority of adzes were found in square 1.

TABLE 1B
ANALYSIS OF ADZES IN SQUARE 2, N38/30

Sq. 2 NO.	LAYER	LENGTH CM	WIDTH CM	THICK. CM	CROSS SECT.	WEIGHT OZ.	STONE	HAMM. DRESS	FLAKED	POL. BLADE	COR- TEX	COM- PLETE	IN- COM- PLETE	ROUGH OUT
779	6b.	13.8	4.8	2.8		7½	g.w.		x		x	bro- ken in 2		x
862	6a.													
805	6b	6	4	1.4		1½	g.w.	x	x				butt end	x
801	6a	6.6	4	1.8		2	g.w.	x	x		x	x		
830	6a.	6.2	3.9	1.8		2	g.w.	x			x		butt end	
847	6a	4.6	3.3	3		1	g.w.	x	x		x		butt end	
771	6a	14.9	6.3	2.7		12	g.w.		x		x	bro- ken in 2		x
842														
861	6a	6.3	3.3	1.8		1	g.w.	x	x					x
854	6a	6.4	5.8	2.8		3	g.w.	x	x		x		butt end	x

Three pieces of burnt clay were found in square 2, layer 4. These showed the hollow impression of a broad flattish surface. One of these concave surfaces fits snugly over the surface of a lenticular adze, AR 731, and might possibly have stuck to the blade of a similar adze used when digging out clay, to be subsequently removed and then accidentally baked in a fire. This could suggest that the small adzes were used to dig out at least part of a clay structure, although clay stuck to a digging stick, if it had a flattish blade, would leave a similar impression.

Several of the small adzes were so near to completion that they could have been used as tools with little further finishing, that is, they were a collection of potential tools. Many of the adzes showed areas of weathered rock cortex suggesting that they were made from local stone quarried from nearby and that the cracking, weathered external blocks formed a large part of the base material used.

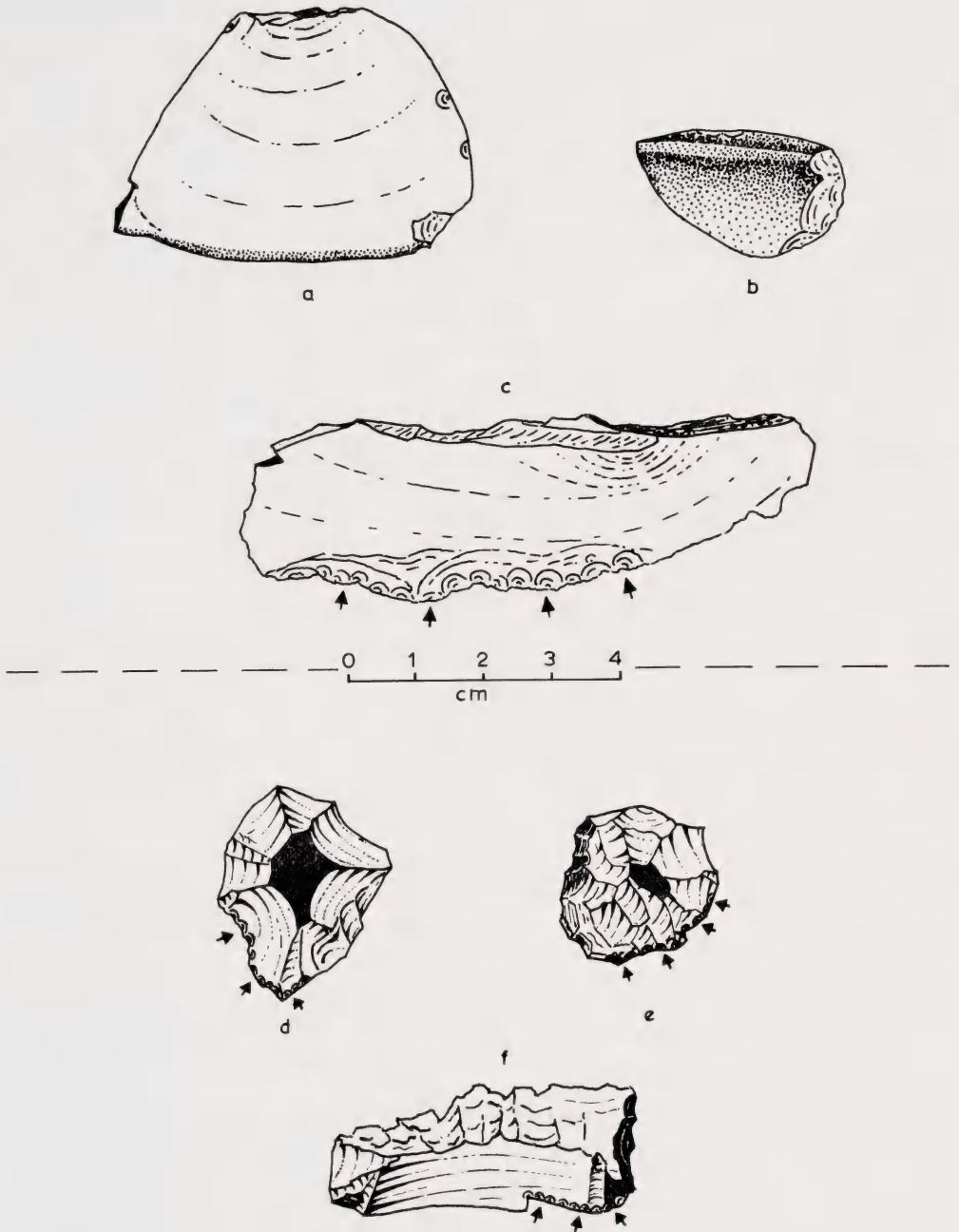
STONE FLAKES

There were 868 stone flakes on the site. The majority were greywacke, but 25 from layer 6 were of a greenish chert that fractured irregularly. All of the external surfaces of this greenish stone showed water-worn areas. Only one small flake suggested any use. It had a sharp end, and the edge of one side had been ground down to make a finger hold. Many of the greywacke flakes showed weathered cortex (26%) or a water-worn surface (13%). Probably unworked blocks of stone or pebbles were taken to the site rather than roughouts. One point six per cent (1.6%) of the flakes had either a polished edge or secondary flaking. Fifteen per cent (15%) of the flakes showed some hammer dressing. Possibly many of the roughouts were worked to the hammer dressing stage on the site and then modified again before finishing, leaving a large number of hammer dressed flakes.

One of the possible sources of the greywacke stone is an outcrop between Administration Bay and Pig Bay, about a mile (1.6 km) from Station Bay across the Island. A small eroded reef runs from the hill out into the sea. Owing to weathering, this outcrop consists of squarish blocks that break naturally into suitable sized lumps or else are sufficiently fractured to be broken off. The reason that a factory site such as the Tahanga quarry at Opito has not been found on Motutapu could be that the blocks of stone were taken elsewhere, such as Station Bay, to work into tools. However, no blocks of stone were found in the excavation. A large

TABLE 2
ANALYSIS OF STONE FLAKES, N38/30

LAYER	FLAKES				
	Total	Worked edge	Hammer dressing	Cortex weathered	Water-worn surface
3	2				
4	10				4
5	1				
6B	249	5	42	59	37
6A	606	9	87	173	75
Total in site	868	14	129	232	112



JMP

FIG. 9. Flake tools, N38/30: a - c, greywacke. d - f, obsidian. a. AR 728b. b. AR 728a. c. AR 728c. d. AR 761. e. AR 782a. f. AR 782b.

greywacke stone core, with flakes struck off it, was found at the base of the ridge below the site. It was an isolated find, but could have been the type of block used for adze or tool making.

The majority of flakes were found in layer 6A and B, and this layer represents a period when stone working took place on the site. The presence of adzes and roughouts in layer 6 confirms this.

Two flakes from polished adzes were found. One was a small chip, showing a polished surface with an angle of hammer dressing along one side. The other, AR 728a (Fig. 9b), was a part blade end and corner of a polished adze. The end away from the blade showed a smoothed or ground-down edge, so that the cutting portion of the blade could have been further used as a flake tool. One flattish flake, AR 728b (Fig. 9a), had been sharpened along the end and one side, forming a knife or scraper. AR 728c was a long narrow flake with secondary flaking, forming a saw or serrated edge. All these flakes were from above the house floor in square 1 in layer 6.

Fourteen flakes (1.6%) in the site showed sharpened, secondary or pressure-flaked edges, suggesting use. One large flake, 9 cm long, 6.1 cm wide, and 1.9 cm thick, came from layer 7. It could have been a roughout for a small adze. It was the only flake found in layer 7 and is not included in Table 2.

The stone flake assemblage was worked on a "contour diagram" (Fig. 10) suggested by Shawcross (1964, p. 13). It showed that about 50% of flakes were

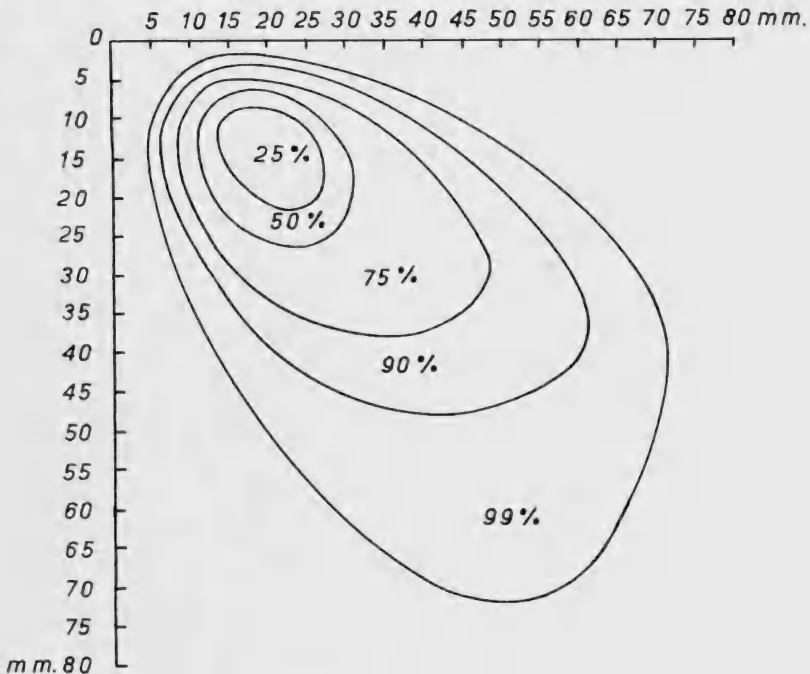
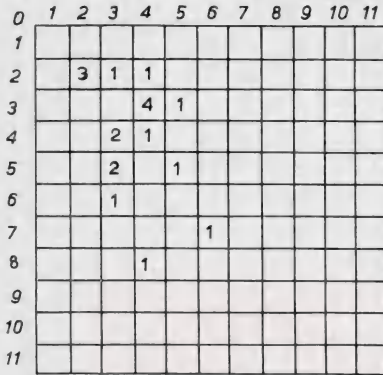
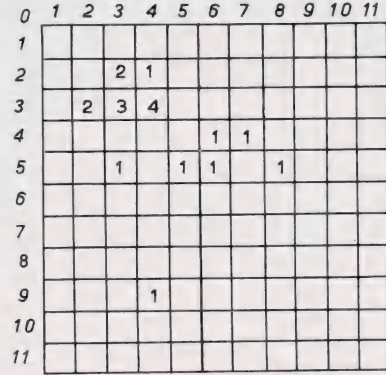


FIG. 10. Dimensions of greywacke flakes, N38/30.

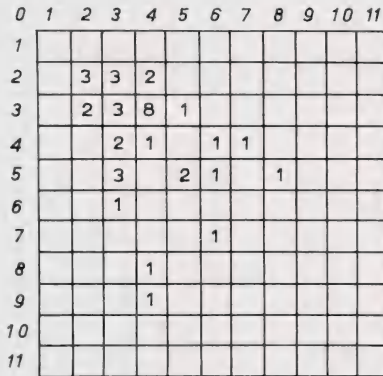
much the same size and had the same length/breadth ratio. They fell within the 25 mm square. The medium flake contour (about 40%) tended to be skewed to width more than length. The few large flakes (under 10%) were longer than they were wide. Overall, the flakes were squarish, with a few reaching well beyond the



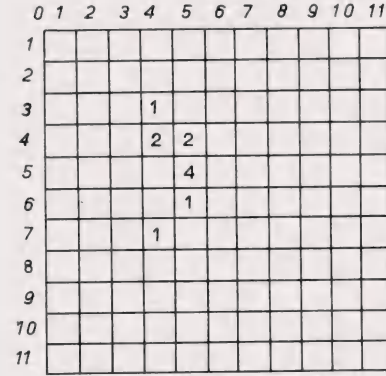
LAYER 6a. FLAKES



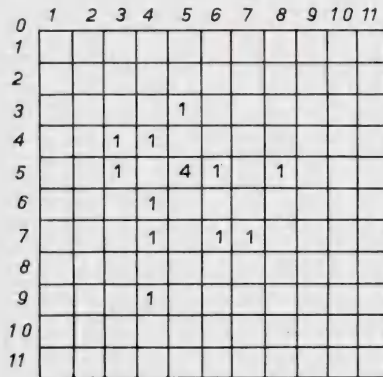
LAYER 6b. FLAKES



LAYERS 6a&b. TOTAL FLAKES



LAYERS 6a&b. TOTAL CORES



ALL USED FLAKES

FIG. 11. Dimensions of obsidian, N38/30. Measurements in 5 mm squares.

average length or width. Most seemed to be by-products of stone working and not struck to make specific tools, although a few had a polished or worked edge suggesting use as a knife or scraper (Fig. 9). These flakes did not appear to be any different from the others and were probably chosen from waste material and then modified for use.

Considering the number of flakes and the smallness of many of the adzes present, it is probable that the final products of the stone working were taken from the site for use elsewhere, either as roughouts or as completed adzes.

OBSIDIAN

The number of pieces of obsidian found in the excavation was 78. Of these, 18 were sent for dating and source identification, 4 were set aside as of uncertain context, and 56 were used for analysis.

The flakes in layer 6 tended to be more wide than long, although the difference was slight. When layer 6A and B were measured separately, however, 6B had more wide flakes and 6A had more long flakes. This difference did not occur in the stone flakes. The used obsidian flakes were almost even in their length/breadth distribution (Fig. 11).

TABLE 3
ANALYSIS OF OBSIDIAN, N38/30

LAYER	Total	Core type	FLAKES				Irregular external surface
			Flakes showing use	Unused flakes	Colour		
					Grey	Green	
4	7	—	2	5	7	—	1
6B	24	5	4	15	19	5	1
6A	25	6	9	10	22	3	2

Although 26 pieces showed signs of use or secondary flaking, the obsidian appeared to be incidental in the site rather than suggesting activity requiring a sharp cutting tool or scrapers. Two pieces were knife-like, and one had a partly indented edge as if something had been squared off at a right angle (Fig. 9f). Two core-like pieces were shaped to a drill point by secondary flaking (Fig. 9d), and showed use on both sides of the point. Three other core-like pieces could have been deliberately made tools or have had small flakes struck off them until they were of no further use. The ends of these "cores" were very crushed and showed pressure flaking, suggesting that they might have been used as semi-circular scoring tools (Fig. 9e). Pressure on these would produce a rounded groove in wood.

HAMMER STONES

Eight complete hammer stones were found and one broken portion. Two were found in layer 4, two in layer 6B, and four in layer 6A. Six of the hammer stones appeared to be red jasper, one was a yellow-green chert, and one was greywacke. All appeared to be water worn stones. The broken lump showed crushing along the remaining edge. Two small flakes of jasper were also found, one in the pit fill, layer 6A, and the other in layer 6B below the pit.

AR 858 and 836, from layer 4 in square 2, were two small angular stones of red jasper that showed crushing around the side angles. One of these was tested on a broken greywacke boulder and it produced fine hammer dressing, similar to that found on the small adzes in the site, with very little effort and pressure. AR 731 was a quadrangular yellow-green chert stone, crushed and chipped at either end. It was found in square 1, layer 6B. AR 780 was a small red jasper stone, similar to AR 858 and 836. It was found in square 2, layer 6B. AR 726 was a roundish flattened stone, flattened top and bottom. The circular sides showed extensive crushing and, in three places, large flakes or pieces had been knocked off. The circular sides and the sharp edges left by flaking showed signs of use. AR 824 was a squarish jasper hammer stone crushed around its angular edges. AR 823 was a round, part grey, part red jasper hammer stone. One surface had been flaked either to obtain a new face or to round it for easier handling. The rest of the stone was crushed on all surfaces, suggesting more or longer use than the other hammer stones. It was found in square 2, layer 6A, just below layer 7. AR 870 was the only greywacke hammer stone found in the site. It was a round, smooth, water-worn stone, flattened top and bottom, with several flakes knocked from one flattened surface. It showed crushing

TABLE 4
HAMMERSTONES, N38/30

SQUARE	LAYER	NUMBER	STONE	SIZE			WEIGHT
				Length cm	Width cm	Thickness cm	
		AR					g
2	4	858	red jasper	5.3	3.3	2.6	72
2	4	836	" "	4.6	4.3	3.1	85
1	6B	731	chert	8.0	5.2	3.2	85
2	6B	780	red jasper	4.5	3.9	3.4	184
2	6A	726	" "	7.2	6.8	4.6	284
2	6A	824	" "	6.5	4.8	4.0	170
2	6A	823	grey and red jasper	6.2	6.2	4.6	227
2	6A	870	greywacke	6.0	6.0	2.8	142

all round the sides. It was found near AR 823 in square 2, layer 6A, just below layer 7. One large, green, water-worn stone was found in layer 6B, almost resting on the Rangitoto ash, below the skeleton. It was flattened top and bottom. There were a few flakes scattered nearby, but none that appeared to be in direct association with it. It did not show bruising typical of hammer stones. Its purpose is unknown, but it could have been suitable as an anvil.

GREENSTONE

One tiny chip of greenstone was found in an earth-filled crack (layer 6B) in the clay near posthole 3, square 1. It was a broken part of the bored hole of an ornament and showed polished facets around the edge of the hole.

BONE

Apart from the skeleton, only small pieces of unidentified crumbling bird or mammal bone were found in the occupation layers. Occasionally, well-preserved fish

rib bones were found, mainly in layer 4. In layer 6A, square 1, the jaw of an animal larger than a rat was found. This appeared to be part of a small rabbit; there was a disturbance in the ground just below the turf and this animal is found on the island.

Two dog canines were found in square 1. One was in layer 6B, in the earth filling a crack in the clay, very close to where the greenstone chip was found. It had been fashioned into a two-piece fishhook barb. The original surface had been ground down to about half the thickness of an average canine, but the curve remained. Just below the sharpened top the nerve canal was exposed. About 5 mm below this was a v-shaped fine groove, forming a double barb. Beyond this barb the tooth had been cut in, thus elevating the small double barb. About 3 mm beyond this the side of the tooth had broken away, exposing the root chamber. The other canine was found in the same square, in layer 6A. It was well preserved, with an almost polished look, but showed no working.

STONE

Both fractured stone, apparently derived from cooking activities, and water-worn pebbles were found in quantity. Weights of both kinds are given in Table 5. It is evident from the Table that most stone occurred in layer 6A.

TABLE 5
WEIGHT OF UNWORKED STONE, N83/30

SQUARE	LAYER	FRACTURED STONE	WATER-WORN STONE
		Kilos	Kilos
2	3	6.5	4
2	4	6.5	1.5
2	6B	4.5	1.5
1	6A	72	16
2	6A	46	15
1	7	6.5	.5
2	7	6.5	1.5

INTERPRETATION

Square 1 contained the floor of a house structure. Postholes 1 and 2 were in alignment longitudinally, and were situated in the posterior and anterior part of the structure. The remains of a drain round part of the west side, along the north side, and continuing down the east side, outlined the house. At the anterior end the ground was raised slightly as a low mound. This formed a raised lip to the house and could have supported a barge board or *paepae*.

The storage pit in square 2 opened on to the central ridge path, just opposite to where the path outside the house joined it. The pit had two postholes in the posterior third and central portion of the floor, but no posthole in the anterior portion. This would facilitate entry down into the pit, and movement in the confined space.

The cooking area was placed below the storage pit, and good use was made of the Rangitoto ash for *haangi* construction.

The death and careful burial probably ended the first occupation. A depression was scraped out of the hard clay by the ridge path below the pit. Moist clay from the pit floor was dug out to form a shallow built-up extension to the grave and contain the body. Some soft earth from the nearby midden area was placed around the body and, finally, it was covered with clay.

Probably the same group of people began the second occupation shortly after the first ended. The posts of the house structure were shored up as shown by the "stepping" of postholes 1 and 2 and the smaller depressions associated with them. Postholes 3 and 4 were added, and a new drain cut in the north-east corner. An attempt was made to form a false floor over the storage pit, apparently to make it usable again with the minimum of effort. Probably the posts were still in position in the pit, and were removed prior to the building of the new floor. Lumps of clay were merely placed over the holes, leaving the deep part empty, possibly with a view to re-opening them when the new floor had consolidated. This work was not completed and once again the site was abandoned.

During the third occupation, the site was used as a working rather than a habitation area. Possibly a new habitation and storage area was built higher up the ridge (the whole ridge has a series of terraces on it), and the site was used as a floor for working stone. The postholes in square 1 were plugged with clay to level the floor, and the gradual building up of layer 6 began.

The time between the second and third occupation does not seem to have been long, as layer 6B, representing the beginning of the third occupation, was heavily impregnated with clay particles that originated, most probably, in the weathered clay surfaces of the house structure and pit, and layer 6 material filled the cracks in the clay of square 1. There was also the similarity of the adze types, from the earliest occupation to those of layer 6, and the use of red jasper as the preferred hammer stone in layers 3, 4, and 6.

Later, the terrace ceased to be used as a working area. Two fire pits were dug into the surface of layer 6 in the pit depression. Debris, earth and stones from activities up the ridge, formed layer 7 and, finally, the site became covered with turf.

CONCLUSIONS

The site gives evidence for three occupations by a domestic unit that changed its constituent members and its living and working conditions through time. The site also gives evidence that the house floor, storage pit, and *haangi* and midden area, comprised a domestic unit such as that postulated by Groube (1965). Although he said that it was not known what sort of storage went with the surface house, this site provides clear evidence of a storage pit associated with a house structure.

ACKNOWLEDGEMENTS

I would like to thank all those who took part in this excavation.

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